I claim:

1. A filter of resonator loaded cavities comprising:

a first electrical connector;

a second electrical connector;

at least three resonator loaded cavities coupled between said first and second electrical connectors to allow exchange of a desired frequency between said first and second electrical connectors, wherein each of said cavities is loaded with a resonator; and

a first set of at least two of said at least three cavities coupled side-by-side to allow exchange of said desired frequency with said first electrical connector, a second set of at least one of said at least three cavities coupled to at least one of said at least two cavities of said first set in order to allow exchange of said desired frequency with said second electrical connector and said at least one cavity of said second set positioned such that said at least one cavity of said second set is stacked in relation to said at least two cavities coupled side-by-side of said first set, as opposed to being positioned side-by-side said at least two cavities coupled side-by-side of said first set.

2. The filter of claim 1, wherein each of said resonators is of a dielectric material and each of said cavities is a cavity formed in a piece of metal.

3. The filter of claim 2, wherein each of said cavities is covered by a cover and includes a tuning screw as part of said cover above each of said cavities.

4. The filter of claim 1, wherein said resonator is a cylinder shape having a round top, a round bottom and a continuous side between said top and bottom; wherein side-by-side positioning of said cavities is relative to the sides of the resonators; and wherein stacking of said cavities is relative to tops and bottoms of said cavities.

5. The filter of claim 1, wherein there are at least four resonator loaded cavities coupled between said first and second electrical connectors to allow exchange of said desired frequency between said first and second electrical connectors; wherein said first set includes at least two of said at least four cavities are coupled side-by-side to allow exchange of said desired frequency with said first electrical connector; wherein said second set includes at least two of said at least four cavities are coupled side-by-side to allow exchange of said desired frequency with said second electrical connector; wherein said first set is stacked in relation to said second set as opposed to being positioned side-by-side each other; and wherein at least one cavity of said first set is coupled to at least one cavity of said second set in order to allow exchange of said desired frequency between said first and second sets.

6. The filter of claim 5, wherein each of said resonators is of a dielectric material and each of said cavities is a cavity formed in a piece of metal.

7. The filter of claim 6, wherein each of said cavities is covered by a cover and includes a tuning screw as part of said cover above each of said cavities.

8. The filter of claim 5, wherein at least one cavity of said first set is negatively coupled to at least one cavity of said second set in order to employ elliptic function filter theory in said filter.

9. The filter of claim 5, wherein said resonator is a cylinder shape having a round top, a round bottom and a continuous side between said top and bottom; wherein side-by-side positioning of said cavities is relative to the sides of the resonators; and wherein stacking of said cavities is relative to tops and bottoms of said cavities.

10. A duplexer filter of resonator loaded cavities for transmitting and receiving signals to and from a device comprising:

an first electrical connector for transmitting and receiving signals;

a second electrical connector for passing a signal from the device to said first electrical connector;

a third electrical connector for passing a signal to the device from said first electrical connector;

a first filter of at least three resonator loaded cavities coupled between said first and second electrical connectors to allow exchange of a desired frequency between said first and second electrical connectors, wherein each of said cavities is loaded with a resonator; and

a second filter of at least three resonator loaded cavities coupled between said first and third electrical connectors to allow exchange of a desired frequency between said first and third electrical connectors, wherein each of said cavities is loaded with a resonator.

11. The filter of claim 10, wherein a first set of at least two of said at least three cavities of said first filter coupled side-by-side to allow exchange of said desired frequency with said first electrical connector, a second set of at least one of said at least three cavities coupled to at least one of said at least two cavities of said first set in order to allow exchange of said desired frequency with said second electrical connector and said at least one cavity of said second set positioned such that said at least one cavity of said second set is stacked in relation to said at least two cavities coupled side-by-side of said first set, as opposed to being positioned side-by-side said at least two cavities coupled side-by-side of said first set; and

wherein a third set of at least two of said at least three cavities of said second filter coupled side-by-side to allow exchange of said desired frequency with said first electrical connector, a fourth set of at least one of said at least three cavities coupled to at least one of said at least two cavities of said third set in order to allow exchange of said desired frequency with said third electrical connector and said at least one cavity of said fourth set positioned such that said at least one cavity of said fourth set is stacked in relation to said at least two cavities coupled side-by-side of said third set, as opposed to being positioned side-by-side said at least two cavities coupled side-by-side of said third set.

12. The filter of claim 11, wherein there are at least four resonator loaded cavities coupled in said first filter between said first and second electrical connectors to allow exchange of said desired frequency between said first and second electrical connectors; wherein a first set of at least two of said at least four cavities of said first filter are coupled side-by-side to allow exchange of said desired frequency with said first electrical connector; wherein a second set of at least two of said at least four cavities of said first filter are coupled side-by-side to allow exchange of said desired frequency with said second electrical connector; wherein said first set is positioned

such that said first set is stacked in relation to said second set, as opposed to being positioned side-by-side each other; and wherein at least one cavity of said first set is coupled to at least one cavity of said second set in order to allow exchange of said desired frequency between said first and second sets; and

wherein there are at least four resonator loaded cavities coupled in said second filter between said first and third electrical connectors to allow exchange of said desired frequency between said first and third electrical connectors; wherein a third set of at least two of said at least four cavities of said second filter are coupled side-by-side to allow exchange of said desired frequency with said first electrical connector; wherein a fourth set of at least two of said at least four cavities of said second filter are coupled side-by-side to allow exchange of said desired frequency with said third electrical connector; wherein said third set is positioned such that said third set is stacked in relation to said fourth set, as opposed to being positioned side-by-side each other; and wherein at least one cavity of said third set is coupled to at least one cavity of said fourth set in order to allow exchange of said desired frequency between said third and fourth sets.

13. The filter of claim 12, wherein at least one cavity of said first set is negatively coupled to at least one cavity of said second set in order to employ elliptic function filter theory in said filter.

14. The filter of claim 12, wherein said resonator is a cylinder shape having a round top, a round bottom and a continuous side between said top and bottom; wherein side-by-side positioning of said cavities is relative to the sides of the resonators; and wherein stacking of said cavities is relative to tops and bottoms of said cavities.

15. The filter of claim 10, wherein said first filter is stacked in relation to said second filter, as opposed to being positioned side-by-side each other.

16. The filter of claim 15, wherein said resonator is a cylinder shape having a round top, a round bottom and a continuous side between said top and bottom; wherein side-by-side positioning of said cavities is relative to the sides of the resonators; and wherein stacking of said cavities is relative to tops and bottoms of said cavities.

17. The filter of claim 15, wherein each of said first and second filter each include at least four resonator loaded cavities coupled side by side in at least a two-by-two matrix.

18. The filter of claim 17, wherein at least one cavity of said first set is negatively coupled to at least one cavity of said second set in order to employ elliptic function filter theory in said filter.

19. The filter of claim 1, wherein said filter is for electronics to allow filtering out of higher harmonics of a desired frequency to be passed through said filter; wherein at least two coupled cavities, each of said cavities loaded with a dielectric resonator which resonates the desired frequency; wherein said cavities and resonators having physical parameters; wherein said resonators being a cylinder having a round top and bottom, said top and bottom connected by a continuous side, said physical parameters of said resonators being a diameter for said top and bottom and a length of said side; wherein said cavities each being an open area of a cylinder shape in a material, said cylinder shape having a round top and bottom, said top and bottom connected by a continuous side, said physical parameters of said cavities being a diameter for said top and bottom and a length of said side; and wherein at least one of said at least two coupled cavities having at least one physical parameter

of said physical parameters of said cavities and resonators being a different value from a same parameter in other of said at least two coupled cavities.

21. The filter of claim 19, wherein said at least one physical parameter is said diameter of said cavities and is said length of said side of said cavities.

22. The filter of claim 19, wherein said at least one physical parameter is said diameter of said resonators and is said length of said side of said resonators.

23. The filter of claim 19, wherein said at least one physical parameter is said diameter of said cavities, is said length of said side of said cavities, is said diameter of said resonators and is said length of said side of said resonators.

24. A filter for electronics to allow filtering out of higher harmonics of a desired frequency to be passed through said filter comprising:

at least two coupled cavities, each of said cavities loaded with a dielectric resonator which resonates the desired frequency;

said cavities and resonators having physical parameters;

said resonators being a cylinder having a round top and bottom, said top and bottom connected by a continuous side, said physical parameters of said resonators being a diameter for said top and bottom and a length of said side;

said cavities each being an open area of a cylinder shape in a material, said cylinder shape having a round top and bottom,

said top and bottom connected by a continuous side, said physical parameters of said cavities being a diameter for said top and bottom and a length of said side; and

at least one of said at least two coupled cavities having at least one physical parameter of said physical parameters of said cavities and resonators being a different value from a same parameter in other of said at least two coupled cavities.

25. The filter of claim 24, wherein said at least one physical parameter is said diameter of said cavities.

26. The filter of claim 24, wherein said at least one physical parameter is said length of said side of said cavities.

27. The filter of claim 24, wherein said at least one physical parameter is said diameter of said resonators.

28. The filter of claim 24, wherein said at least one physical parameter is said length of said side of said resonators.

29. The filter of claim 24, wherein said at least one physical parameter is said diameter of said cavities and is said length of said side of said cavities.

30. The filter of claim 24, wherein said at least one physical parameter is said diameter of said resonators and is said length of said side of said resonators.

31. The filter of claim 24, wherein said at least one physical parameter is said diameter of said cavities, is said length of said side of said cavities, is said diameter of said resonators and is said length of said side of said resonators.